Stoller
Hanford Office

DOE-EM/GJ1056-2005

299-E24-57 (A5914)
Log Data Report

Borehole Information:

Borehole: 299-E24-57 (A5914)			**Site:** 216-A-5 Crib		
Coordinates (WA St Plane)		**GWL[1] (ft) :** None		**GWL Date:**	10/10/05
North (m)	**East (m)**	**Drill Date**	**Ground Level Elevation (ft)**	**Total Depth (ft)**	**Type**
135509.872	575049.123	02/55	718.47	150	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded Steel	1.7	8 5/8	8	5/16	1.7	150

Borehole Notes:

The logging engineer measured the 8-in. casing diameter and stickup using a steel tape.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 4E		**Type:**	SGLS (70%) SN: 34TP40587A
Effective Calibration Date:	12/21/04	**Calibration Reference:**	DOE-EM/GJ854-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Neutron Moisture Logging System (NMLS) Equipment Information:

Logging System:	Gamma 4F		**Type:**	SN: H380932510
Effective Calibration Date:	10/24/05	**Calibration Reference:**	DOE/EM-GJ1020-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2**	**3 Repeat**		
Date	10/17/05	10/18/05	10/18/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	2.0	86.0	90.0		
Finish Depth (ft)	87.0	149.0	105.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A[2]	N/A	N/A		

Log Run	1	2	3 Repeat		
Pre-Verification	DE931CAB	DE941CAB	DE941CAB		
Start File	DE931000	DE941000	DE941064		
Finish File	DE931085	DE941063	DE941079		
Post-Verification	DE931CAA	DE941CAA	DE941CAA		
Depth Return Error (in.)	0	N/A	0		
Comments	No fine gain adjustment.	No fine gain adjustment.	No fine gain adjustment.		

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	4	5	6	7 Repeat	
Date	10/18/05	10/19/05	10/19/05	10/19/05	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	2.0	38.0	102.0	52.0	
Finish Depth (ft)	39.0	103.0	148.0	67.0	
Count Time (sec)	N/A	N/A	N/A	N/A	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
Sample Interval (ft)	0.25	0.25	0.25	0.25	
ft/min	1.0	1.0	1.0	1.0	
Pre-Verification	DF012CAB	DF022CAB	DF022CAB	DF022CAB	
Start File	DF012000	DF022000	DF022261	DF022446	
Finish File	DF012148	DF022260	DF022445	DF022506	
Post-Verification	DF012CAA	DF022CAA	DF022CAA	DF022CAA	
Depth Return Error (in.)	N/A	N/A	N/A	0	
Comments	None	None	None	None	

Logging Operation Notes:

Logging was conducted with a centralizer on the sondes. Logging data acquisition is referenced to the top of casing. Repeat sections were collected in this borehole to evaluate system performance.

Analysis Notes:

Analyst:	Henwood	Date:	11/29/05	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after each day's data acquisition. Acceptance criteria were met.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet template identified as G4EApr05.xls. A casing correction for 5/16-in.-thick casing was applied to the SGLS data. The neutron moisture data were corrected for an 8-in. inside diameter casing.

Results and Interpretations:

^{137}Cs was detected from 55 to 65 ft. The maximum measured concentration was approximately 314 pCi/g at 58 ft.

^{154}Eu was detected from 57 to 68 ft and from 90 to 94 ft. The maximum concentration was approximately 2 pCi/g at 63 ft.

An elevated total gamma count rate is observed at 129 ft. No man-made radionuclides were detected in this interval and the naturally occurring radionuclides do not appear to contribute significantly to the count rate. The cause of the activity is unknown and could reflect the existence of radionuclides below the SGLS detection limits.

Moisture measurements show considerable variability with the maximum percent moisture occurring at approximately 130.5 ft. This high moisture zone lies just below an interval of slightly elevated gamma activity (source of activity not known) at 129 ft.

The repeat sections for the SGLS and NMLS indicate good agreement for the naturally occurring and man-made radionuclides and moisture content.

Historical total gamma log data acquired in 1959, 1963, and 1976 have been compared to the current SGLS total gamma log data. It appears there was an influx of contamination prior to May 1959 between 50 and the bottom of the borehole (141 ft). By 1963, additional contamination can be observed between 85 ft and the bottom of the borehole. The contaminants apparently decayed away by 1976 except between 55 and 60 ft. This interval approximately coincides with the elevated SGLS total gamma data where ^{137}Cs and ^{154}Eu are detected.

List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
Total Gamma and Moisture
Repeat of Man-Made Radionuclides
Repeat Section of Natural Gamma Logs
Moisture Repeat Section
SGLS and Historical Total Gamma

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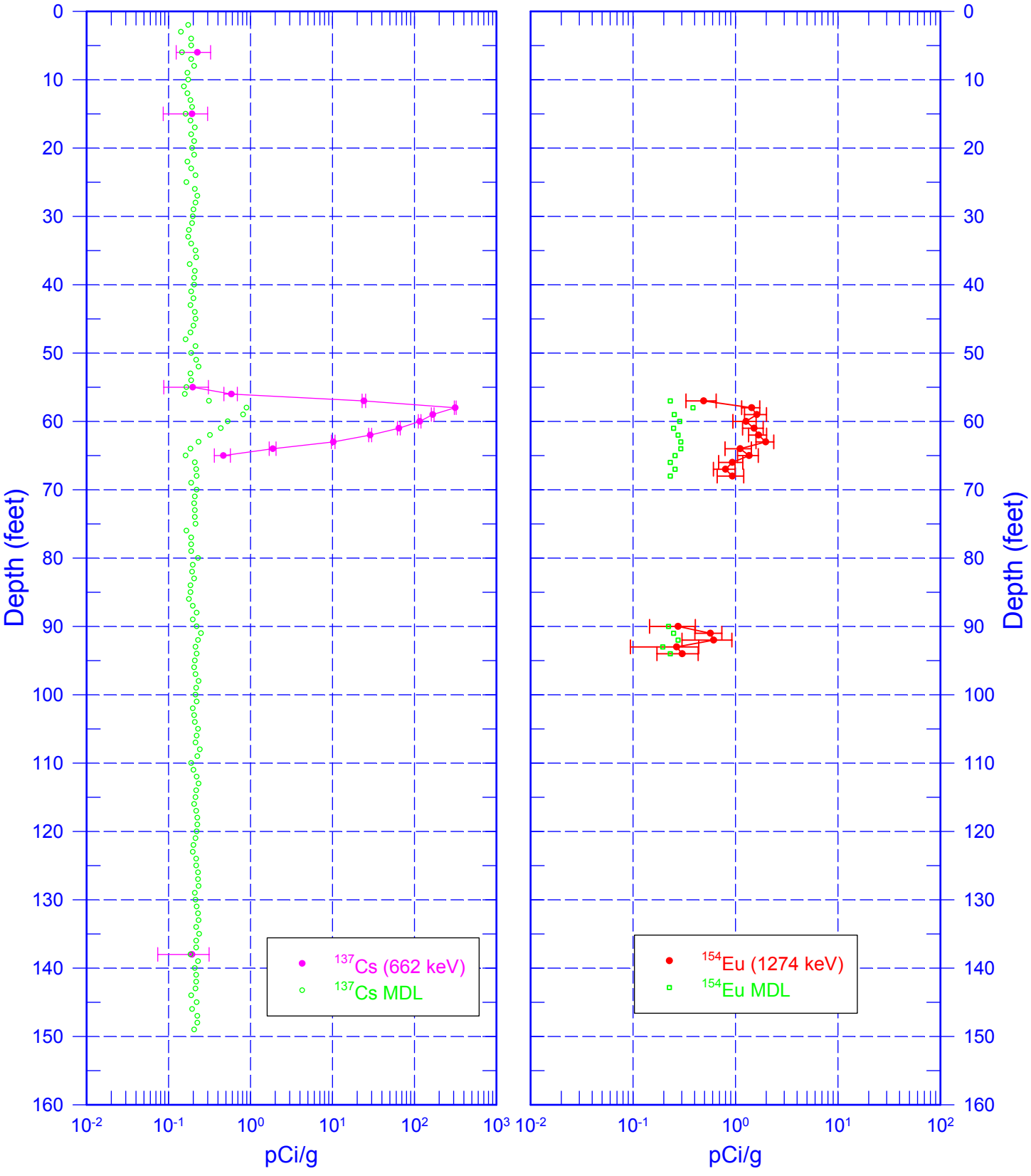
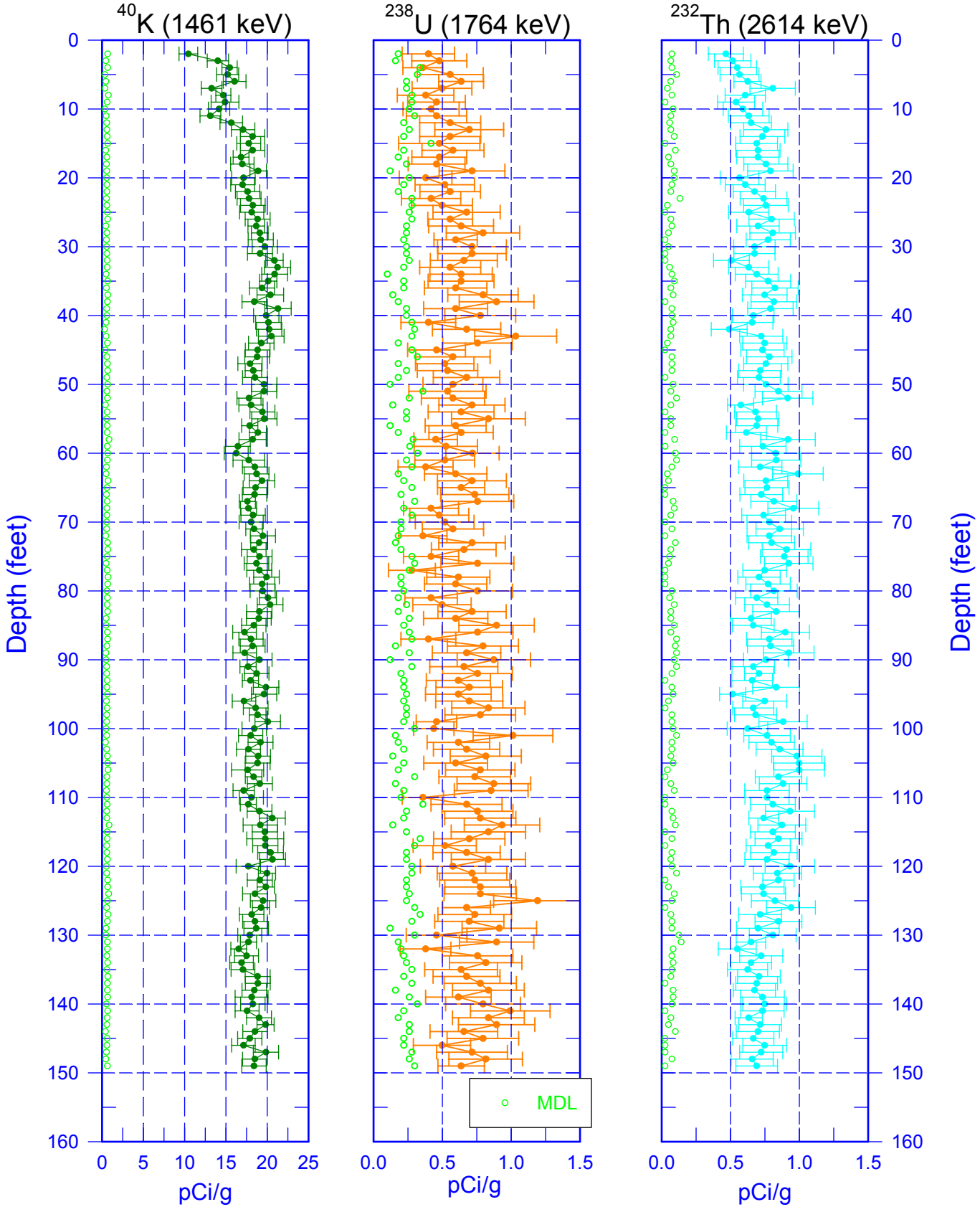
[1] GWL – groundwater level
[2] N/A – not applicable

299-E24-57 (A5914)
Man-Made Radionuclides



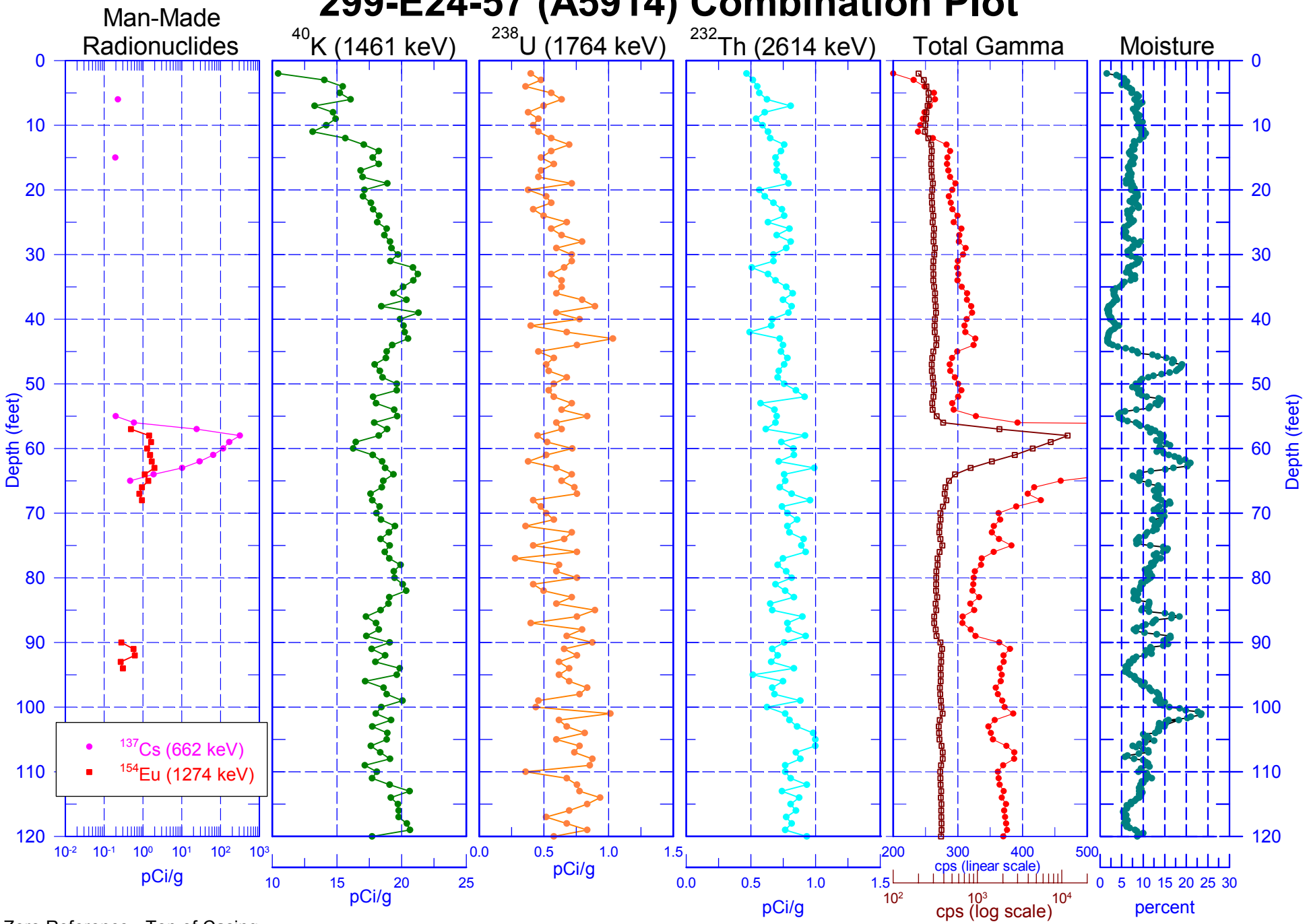
Zero Reference - Top of Casing

299-E24-57 (A5914)
Natural Gamma Logs



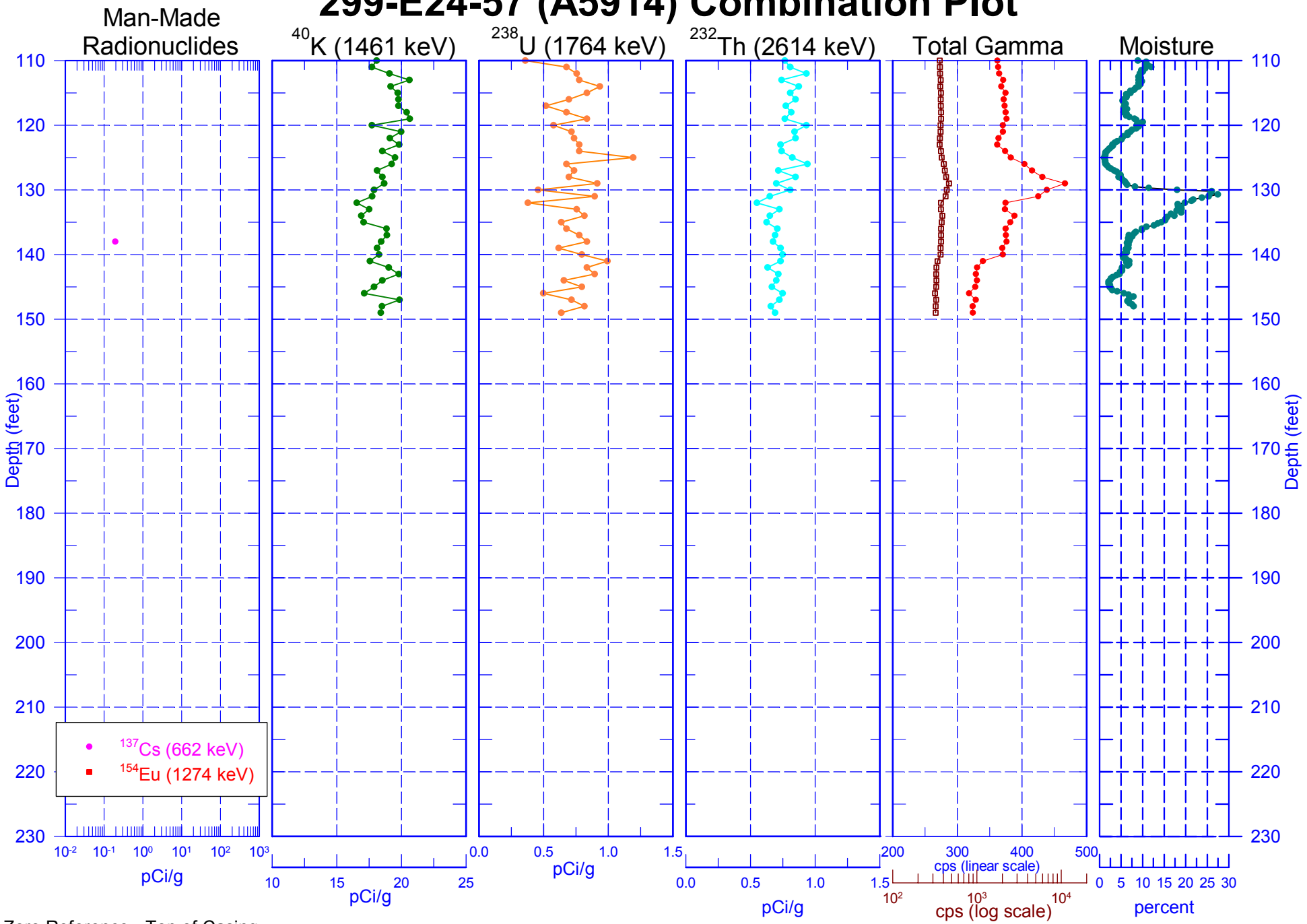
Zero Reference = Top of Casing

299-E24-57 (A5914) Combination Plot



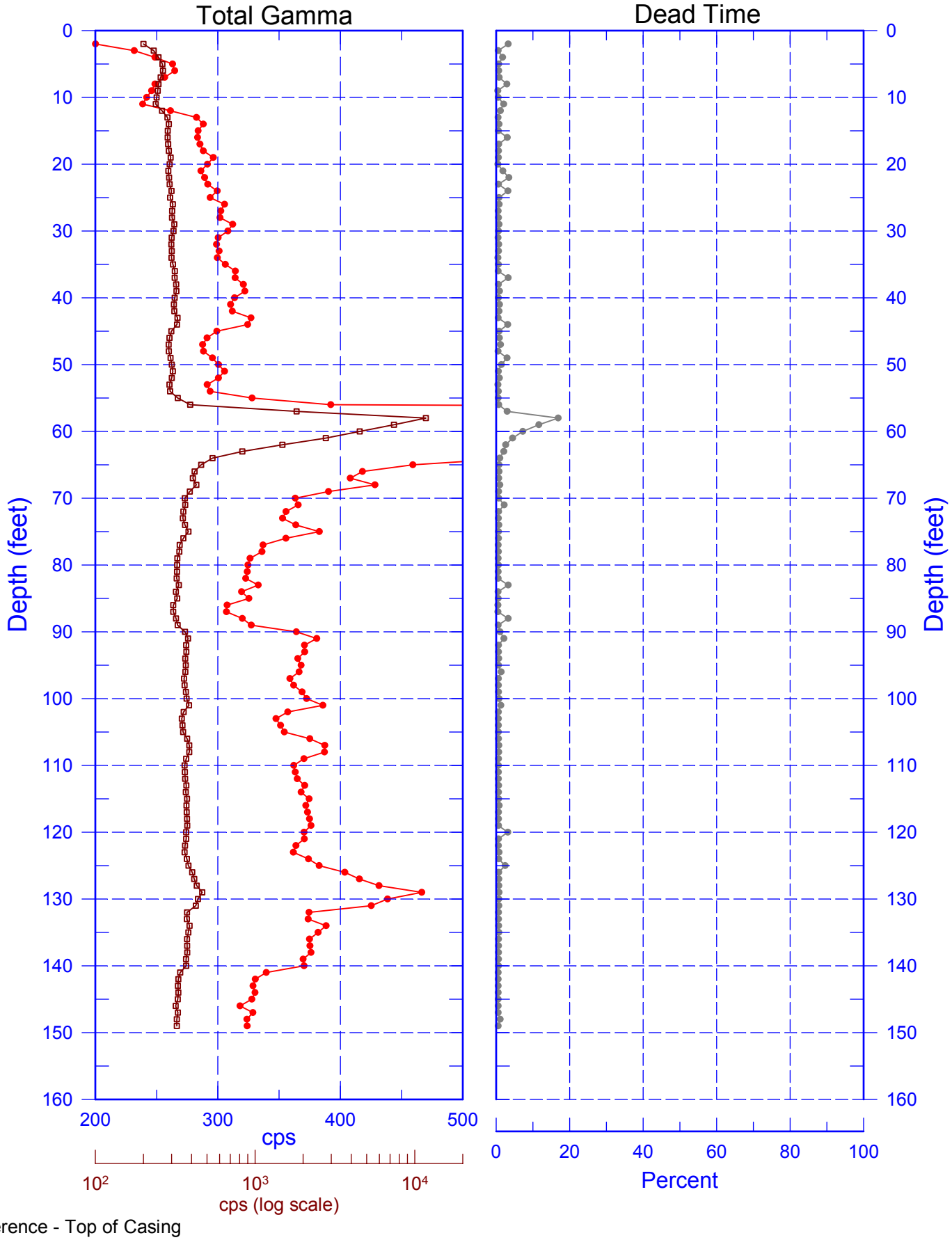
Zero Reference - Top of Casing

299-E24-57 (A5914) Combination Plot



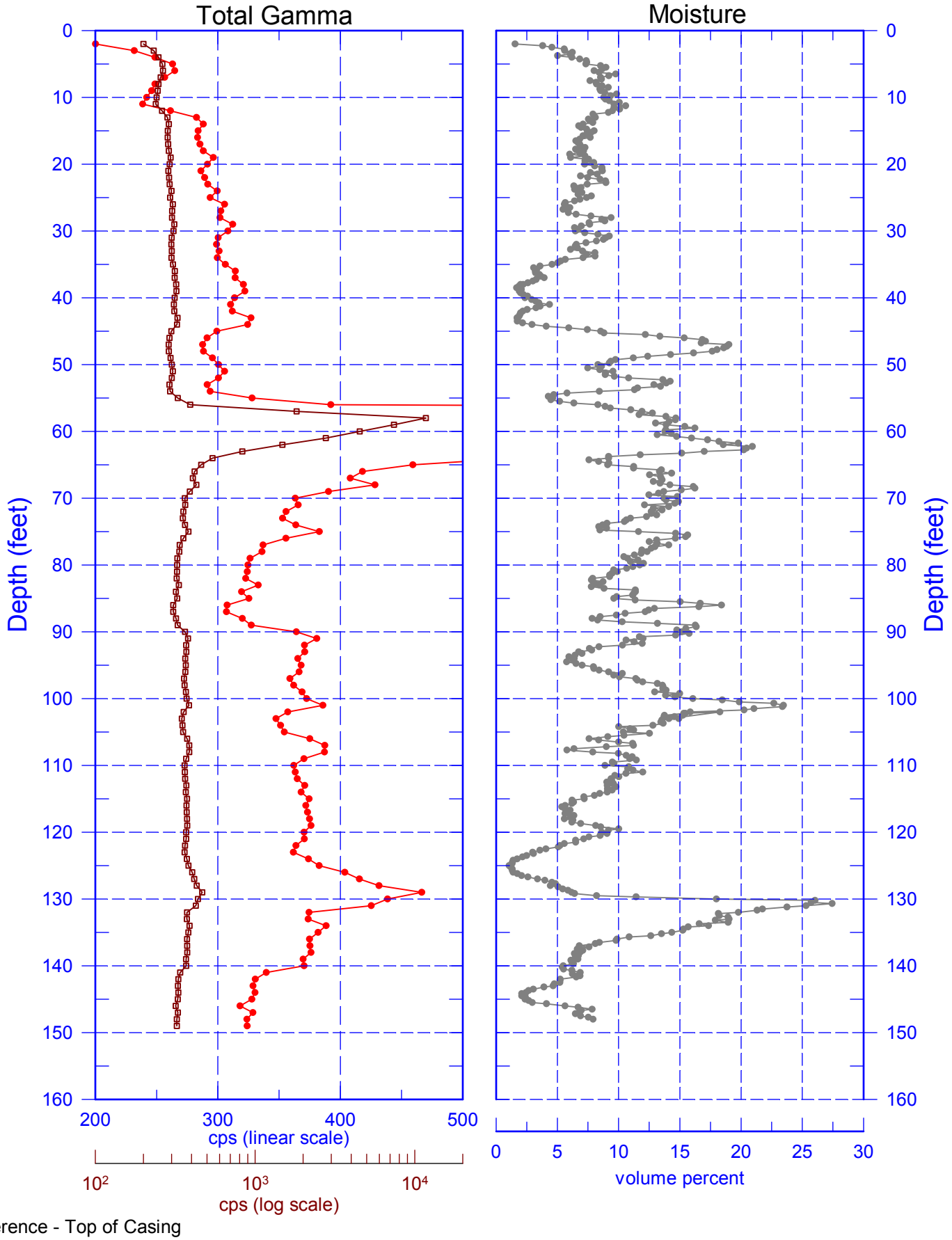
Zero Reference - Top of Casing

299-E24-57 (A5914)
Total Gamma & Dead Time



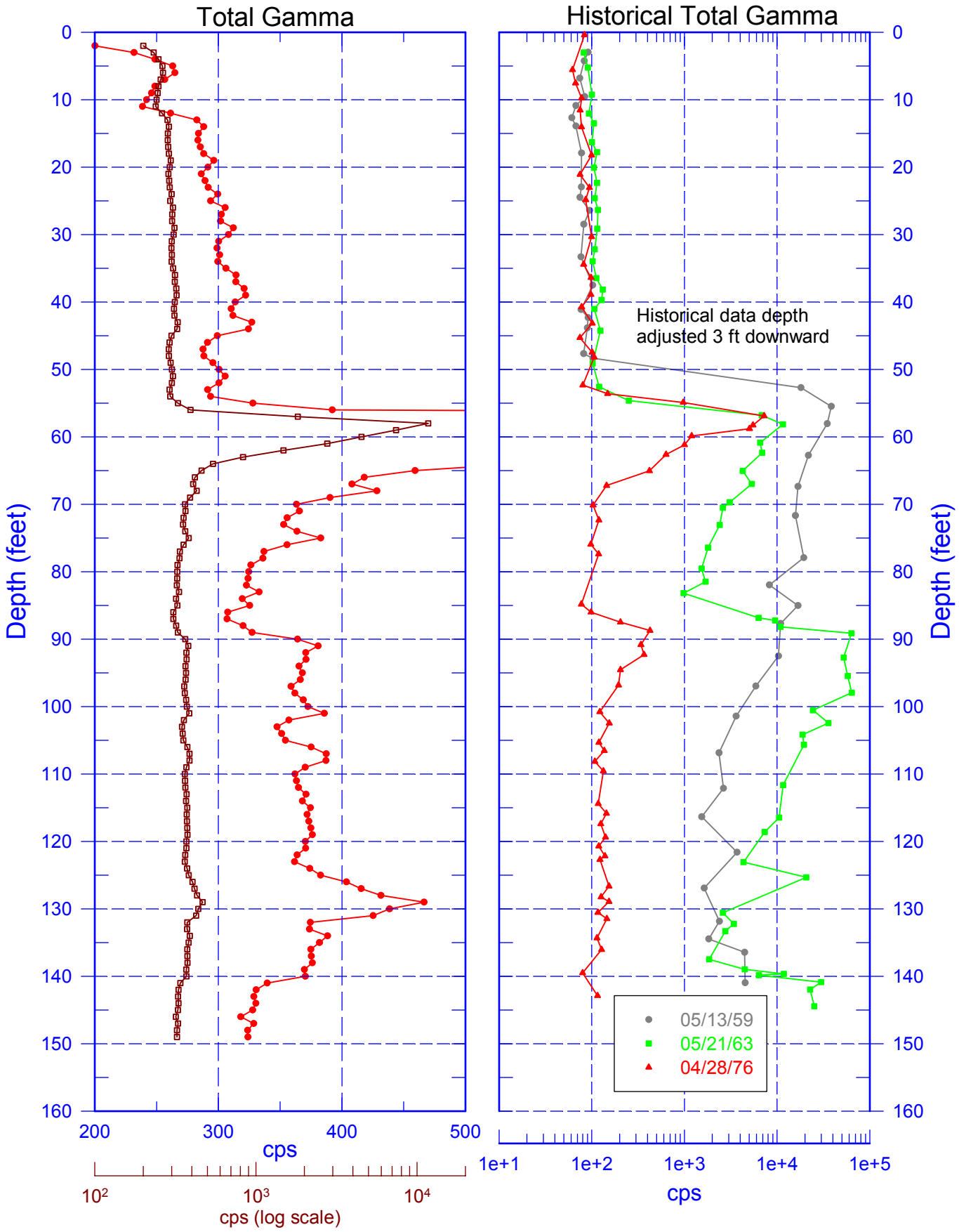
Reference - Top of Casing

299-E24-57 (A5914)
Total Gamma & Moisture



Reference - Top of Casing

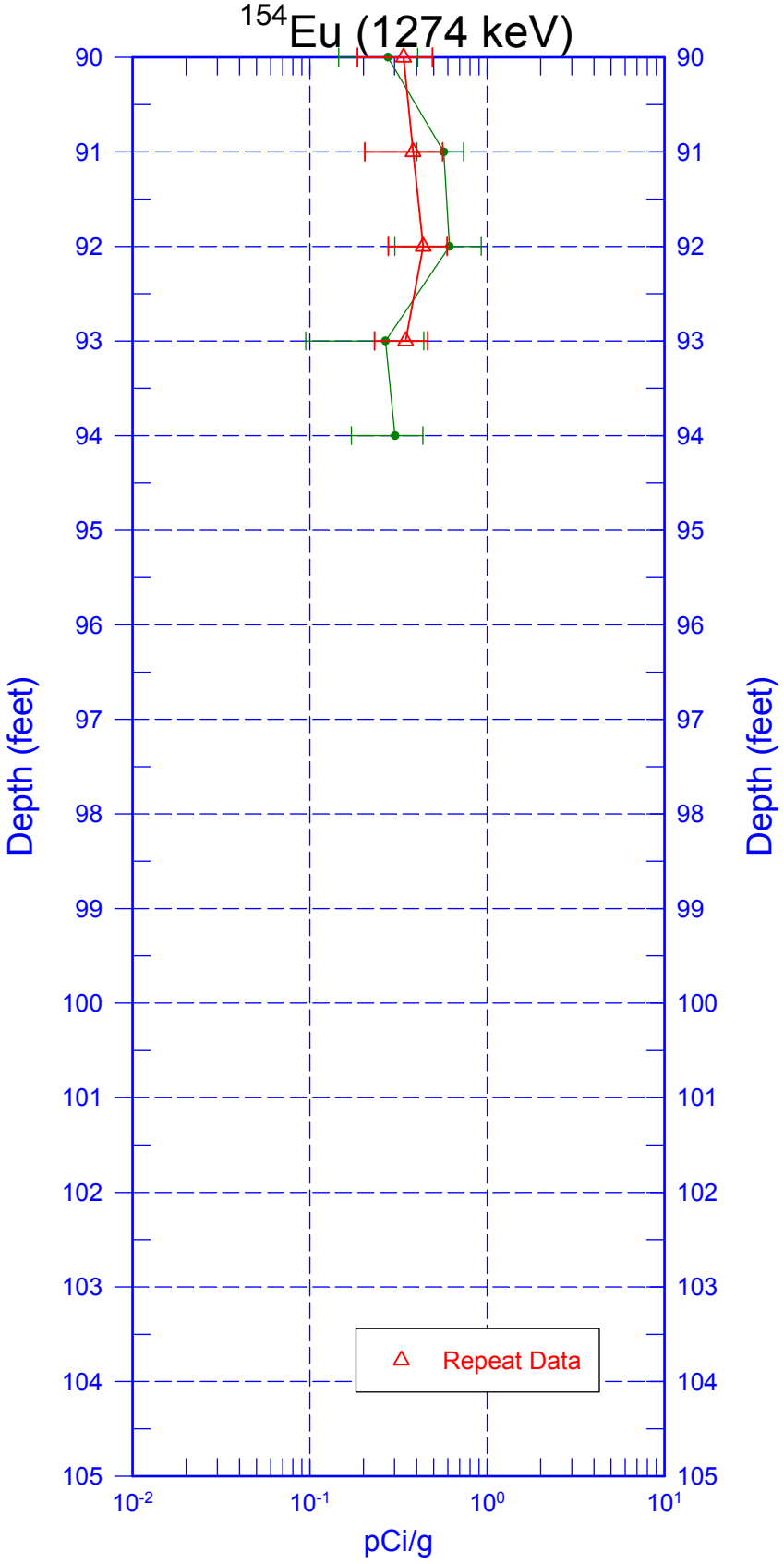
299-E24-57 (A5914)
SGLS and Historical Total Gamma



Reference - Top of Casing

299-E24-57 (A5914)

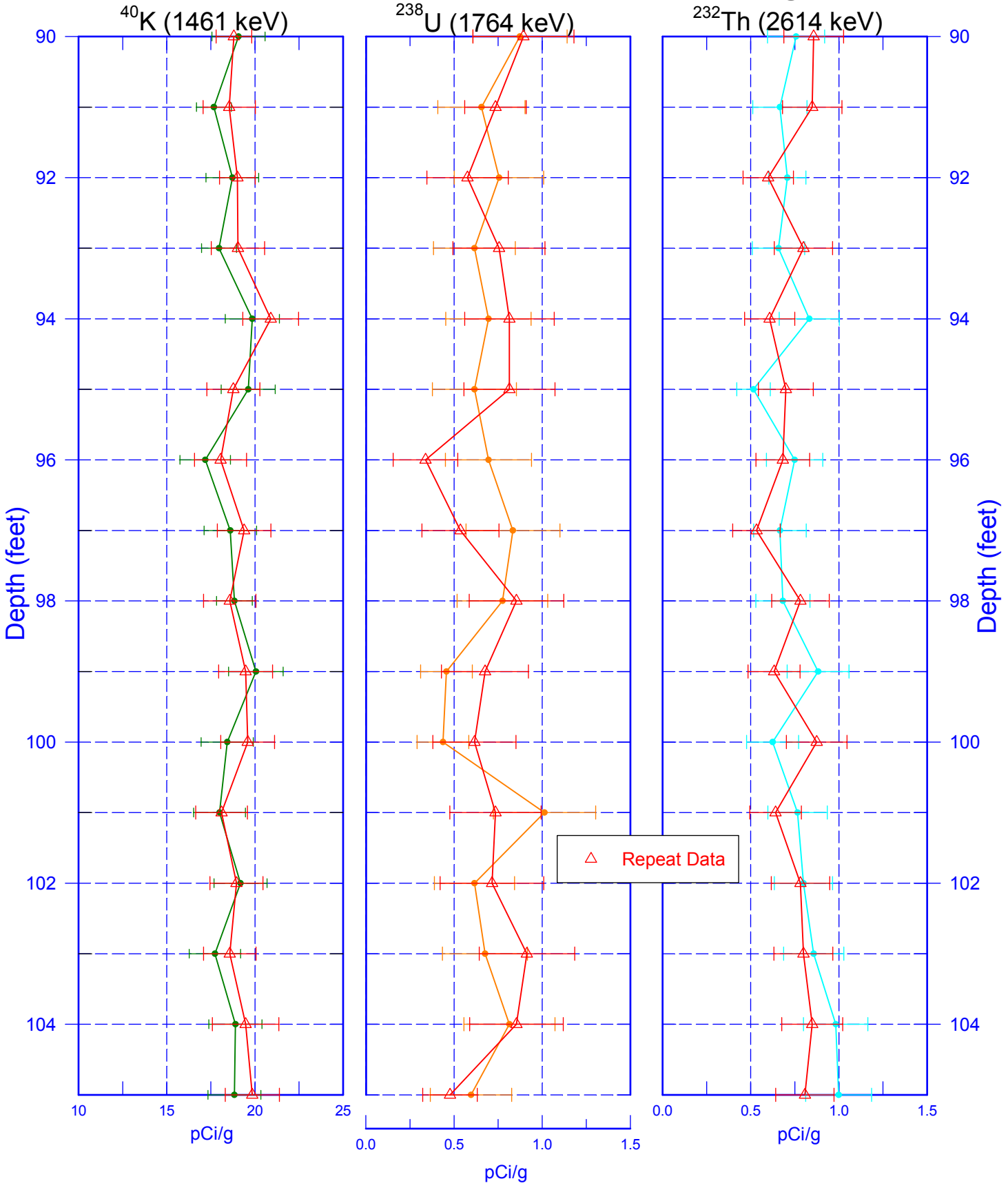
Repeat of Man-Made Radionuclides



Zero Reference - Top of Casing

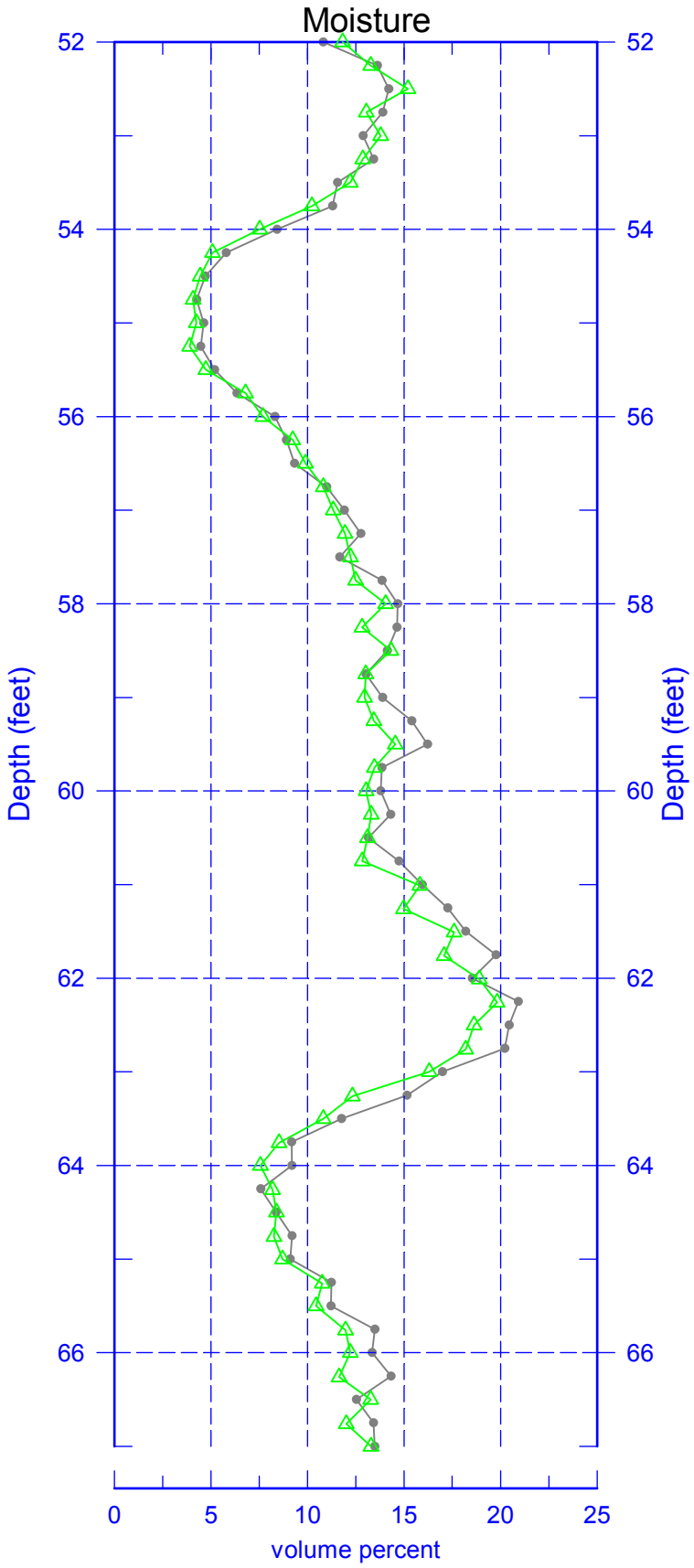
299-E24-57 (A5914)

Repeat Section of Natural Gamma Logs



Zero Reference - Top of Casing

299-E24-57 (A5914)
Moisture Repeat Section



Reference - Top of Casing